HEALTH AND SAFETY PLAN FOR THE VERIFICATION STUDY NAS KEY WEST FL

12/1/1985

GERAGHTY AND MILLER INC

Health And Safety Plan For The Verification Study At The NAS Key West, Florida

Prepared For

DEPARTMENT OF THE NAVY
Southern Division,
Naval Facilities
Engineering Command

Charleston, South Carolina

GERAGHTY & MILLER, INC.
GROUND-WATER CONSULTANTS

LANDMARK OFFICE CENTER
14310 N. Dale Mabry Hwy., Ste. 200, Tampa, Florida 33618 (813) 961-1

GERAGHTY & MILLER, INC.

HEALTH AND SAFETY PLAN FOR THE VERIFICATION STUDY AT THE NAS - KEY WEST

Prepared for

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
Charleston, South Carolina

December 1985

Prepared by

Geraghty and Miller, Inc.
Ground-Water Consultants
14310 North Dale Mabry Highway, Suite 200
Tampa, Florida 33618

TABLE OF CONTENTS

TABLE OF CONTENTS

FIGURE DESCRIPTIONS

LIST OF TABLES

GENERAL INFORMATION

CLIENT: Department of The Navy
Naval Facilities Engineering Command
Job No. T0290KW2

PROJECT MANAGER: Mr. Fred Seguiti

SITE: Key West, Florida - Naval Air Station

SITE LOCATION: Key West, Florida

PURPOSE OF SITE INVESTIGATION:

The purpose of the Phase II Study is to define the vertical and horizontal extent of contamination located at the nine sites on NAS - Key West, Florida. The investigation will include the installation of shallow ground-water monitoring wells and soil borings, the collection of soil materials for geological logging and the collection of ground-water and soil samples from each site.

DURATION OF SITE INVESTIGATION:

After notice to proceed, approximately 4 months.

OVERALL HAZARD SUMMARY:

Serious _____	Moderate _____
Low x	Unknown _____

INTRODUCTION

This study represents the second phase of a study initiated in June of 1985 by Geraghty and Miller, Inc. (G&M) for the Naval Facilities Engineering Command (the Contractor). The first phase of study was described in a May 1985 document entitled "Initial Assessment Study, Naval Air Station, Key West, Florida" (IAS). The Phase I report identified and assessed eight potentially contaminated sites and for their threat to human health and the environment.

The results of the IAS study recommended further investigation at six sites. In addition, three other sites have been recommended for investigation based on information collected after completion of the IAS report. These recommendations prompted Phase II, the Confirmation Study, in order to assess the potential long-term impacts to the environment and public health at each site. Another document entitled "Plan of Action, Naval Assessment and Control of Installation Pollutants, Verification Study, NAS-Key West, Florida," contains a description of the proposed work plan including figures showing the individual study sites with monitor well and soil sampling locations.

A personnel site Health and Safety Plan has been assembled based upon requirements described in the "Standard Operating Safety Guides" written by the Environmental Response Branch, Hazardous Response Support Division, Office of Emergency and Remedial Response U.S. Environmental

Protection Agency. Guidelines provided in this EPA publication have been supplemented by a site visit conducted October 15 and 16, 1985, by Dr. Ralph E. Moon (G&M), Mr. Fred Seguiti (G&M), Joe Aviols (U.S. Navy) and Mr. Sonny Chestnut (Naval Facilities Engineering Command). The on-site visit was supplemented by the Phase I report, aerial photographs of historical importance and interviews with personnel associated with the study sites prior to the preparation of the Health and Safety Plan.

G&M RESPONSIBILITY

G&M is solely responsible for its personnel and subcontractors' adherence to the site health and safety plan during the investigation. G&M agrees to perform all work in accordance with the health and safety requirements described herein, the current edition of the Standard Operating Safety Guides prepared by the EPA Office of Emergency and Remedial Response, Hazardous Response Support Division, and all Federal, OSHA, State and local health and safety regulations.

G&M has designated Dr. Ralph E. Moon as the Site Health and Safety Officer to implement, monitor, and enforce the Site Health and Safety Plan. Dr. Moon has experience in Federal and State environmental laws and Federal and State occupational safety and health regulations. His formal educational training in occupational safety and health includes: (1) three years working experience in and chemical laboratory safety at an academic and industrial research facility; and (2) certification as a Hazardous Materials Manager at the masters level.

The Site Health and Safety Officer has the option to implement requirements in addition to those described herein on a case-by-case basis. Should an unforeseen or site-specific safety related factors, hazard or condition become evident during the drilling, G&M will take action to re-establish safe working conditions and to safeguard site personnel, the public and the environment. Actions taken by

G&M to safeguard workers taken beyond those measures described in this plan will be verbally communicated to Mr. Sonny Chestnut (Naval Facilities Engineering Command) prior to implementation and submitted in writing at the request of the Contractor.

SITE DESCRIPTION LIST AND WASTE CHARACTERISTICS

A description of each waste site (Figure 1), past disposal practices, and the substances that may be present are assembled in the following pages along with G&M's recommendation for the level of personnel protection and the on-site monitoring that will be conducted by G&M throughout the progress of the work. Human health, toxicity and proper protective clothing for specific chemicals referenced for each site is described in Appendix A.

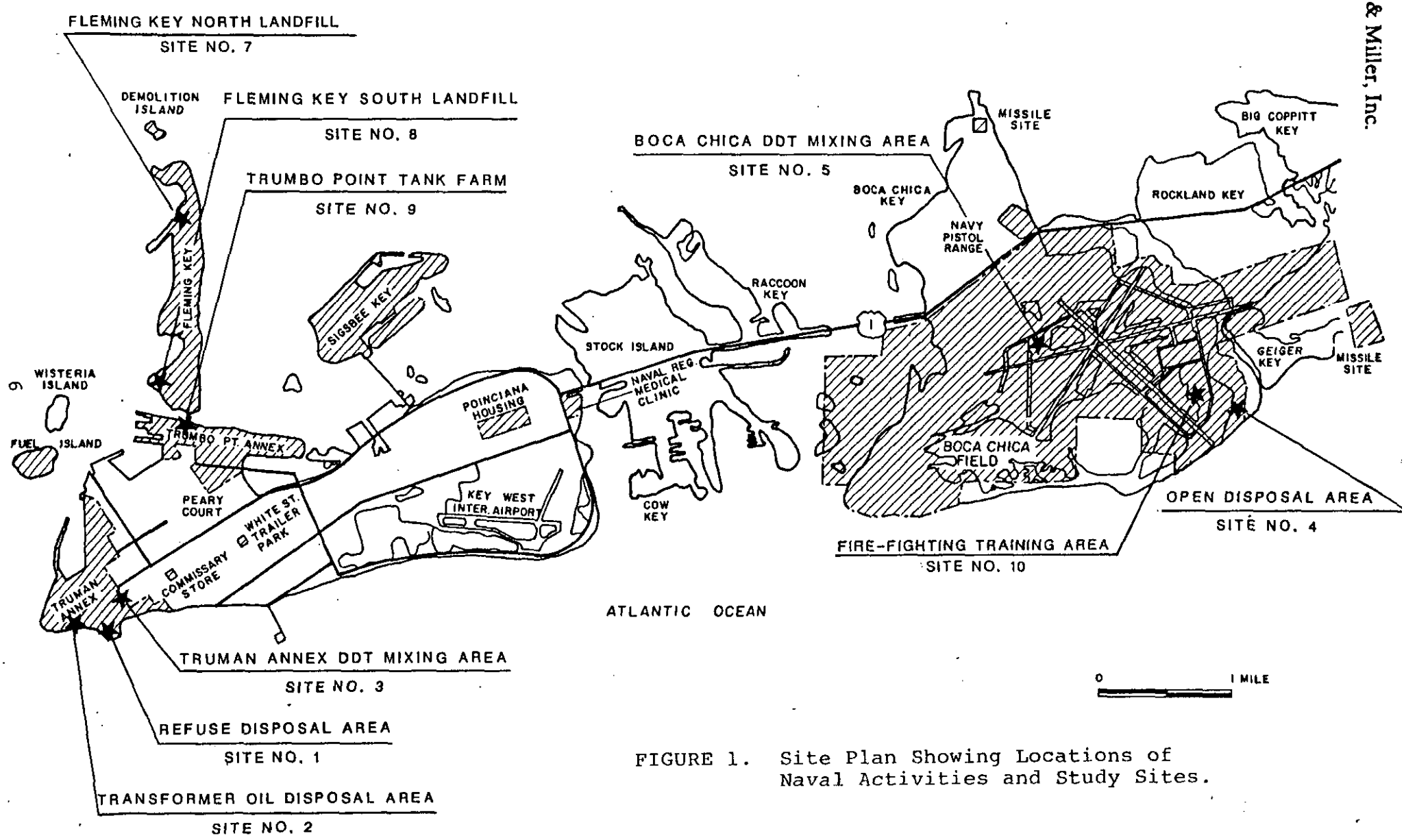


FIGURE 1. Site Plan Showing Locations of Naval Activities and Study Sites.

ILL EFFECTS OF HEAT

Heat Stroke and Heat Exhaustion

Heat stroke is always life-threatening. Heat exhaustion is a milder condition than heat stroke. Both conditions occur most often on hot days during physical activity. Anyone can have either condition, and either condition can happen to older people even during such mild activity as taking a walk.

In heat stroke, the person's temperature control system that causes sweating stops working correctly. The body temperature rises so high that brain damage and death will result if the person is not cooled quickly. The main signs of heat stroke are red or flushed skin; hot, dry skin, although the person may have been sweating earlier; and extremely high body temperature, often to 41°C (106°F). There may be dizziness, nausea, headache, rapid pulse, and unconsciousness.

Heat exhaustion is much less dangerous than heat stroke. The major signs of heat exhaustion are pale, clammy skin, profuse perspiration, and extreme tiredness or weakness. The body temperature is approximately normal. The person may have a headache and may vomit.

Here are the most important differences between the signs for heat stroke and heat exhaustion:

Heat stroke: skin hot and dry, and very high body temperature.

Heat exhaustion: skin cool and wet from sweating, and normal body temperature.

Cool a victim of heat stroke quickly. If the body temperature is not brought down fast, permanent brain damage or death will result. Soak the person in cool but not cold water, sponge the body with rubbing alcohol or cool water, or pour water on the body to reduce the temperature to a safe level—about 39°C (102°F). Then stop cooling and observe the victim for 10 minutes. If the temperature starts to rise again, cool the victim again. Do not give coffee, tea, or alcoholic beverages. When the victim's temperature remains at a safe level, put the victim to bed and get medical help.

For mild heat exhaustion, provide bed rest. Give a salt solution (1/2 teaspoon salt—about 2 "pinches"—in 1/2 glass of water) every 15 minutes for 3 or 4 doses. Medical care is needed for severe heat exhaustion.

It may be hard to remember the names of the two conditions, but it should be easy to remember this: A victim who is very hot and not sweating (heat stroke) must be cooled off quickly, but a victim who is sweating, has a normal temperature, and is tired (heat exhaustion) needs rest but does not need to be cooled off so vigorously.

Heat Cramps

Heat cramps usually involve the abdominal muscles or the limbs; heat cramps may accompany heat exhaustion.

Firm pressure, and warm, wet towels placed over the cramped area give relief. Give a salt water solution to drink, as you would for heat exhaustion.

EMERGENCY INFORMATION

At the NAS, Key West Facility (Life threatening event) (Use last 4 digits when on base)

Ambulance: 294-2337

Dispensory: 294-3500 (24 hours/day)

Security: 296-7706

Fire: 3333

Occupational Safety and Health Officer: Mr. Ted Simmons
296-3561 Ext. 2757

Quarter Deck: 294-2971 (Always Open)

Off the Base, Key West Facility

Fire: 294-4641 or 919

Police: 294-2511 or 919

Ambulance: 919

Poisen Control: 294-5531 Ext. 711

Depoo Hospital: 296-8526

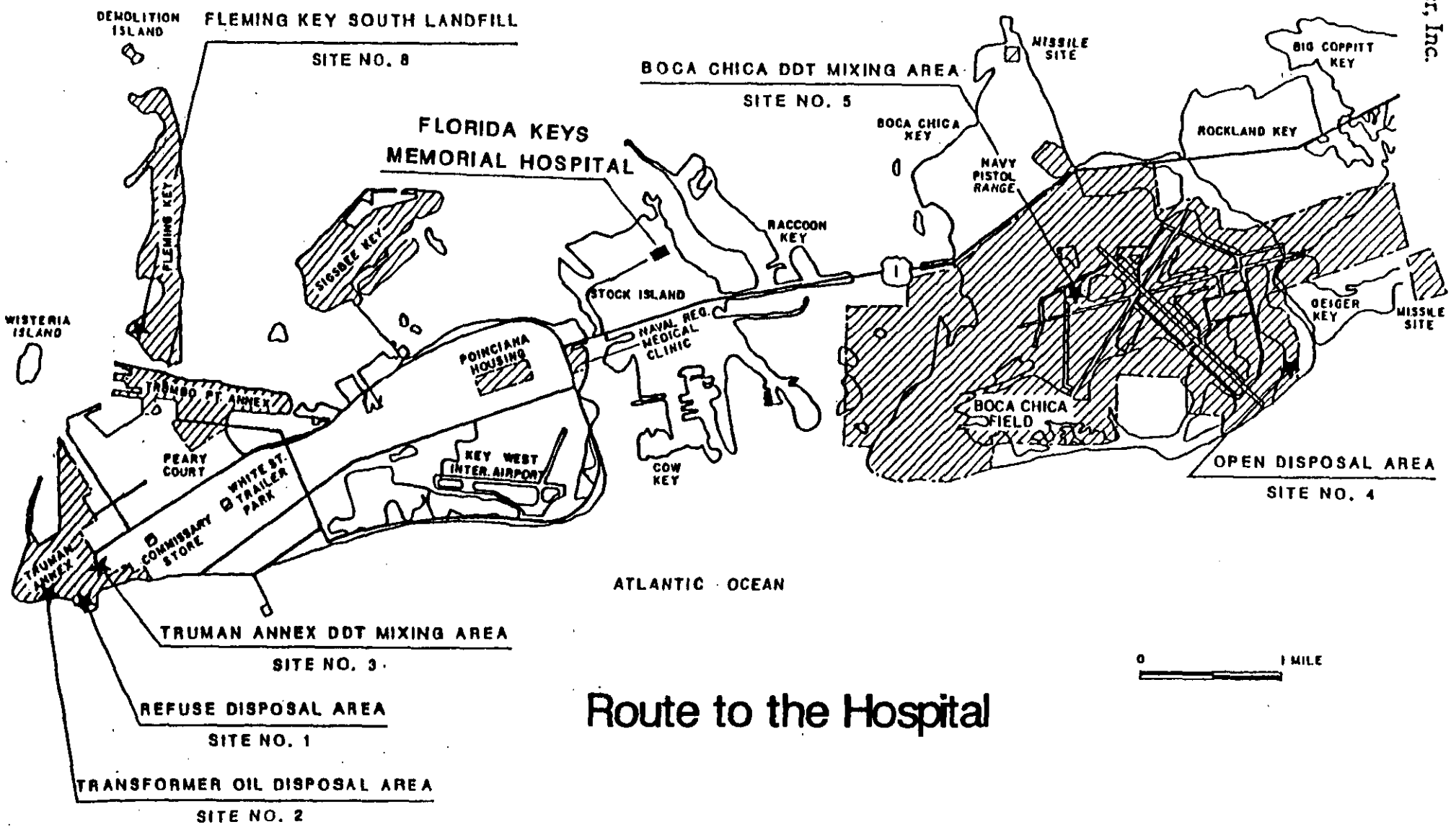
Florida Keys
Memorial: 294-5531
Emergency Room: 294-6666

Geraghty & Miller, Inc. Safety & Health Officer:

Dr. Ralph E. Moon 813-961-1921 (Work)
813-870-0451 (Home)

Occupational Health Physician:

Dr. Nicholas Alexiou, M.D.,MPH
813-974-3294 (Clinic)
813-443-3691 (Home)



Route to the Hospital

Geraghty & Miller, Inc.

Site Name: Site #1: Refuse Disposal Area

Site Description: The Truman Annex Refuse Disposal Area is located along the shore and adjacent to a current antenna field (Figure 1). The landfill area was active from 1952 until the mid-1960's and received a heterogeneous mixture of material from the NAS. In addition to solid waste materials (telephone poles, tree clippings, paper, pipe, metal products) shop wastes may have also been included i.e., paint thinners and solvents.

Substances of Safety and Health Concern:

Waste Solvents and Degreasing Agents	x	Sludge Disposal	
Radioactive Wastes		Corrosive Liquids	
Treated Industrial Wastes		Plating Wastes	
Liquid Waste/Free Product Potential		Metal Wastes	
Asbestos Disposal		Cleaning Solutions	x
PCB Disposal		Paint Wastes	x
		Non-hazardous Wastes	x

Level of Personnel Protection

Level A	
Level B	
Level C	
Level D	x

Monitoring Parameters

Total Ionizable Pollutants	x
Explosion Potential	x
Radiation	

Site Name: Site #2: Transformer Oil Disposal Area

Site Description: The Transformer Oil Disposal Area is a gravel/limestone parking area adjacent to Building 795, a Defense Property Disposal Office. During the mid-1950's through 1970, this 0.5 acre area was the receiving site for off-line transformers. Transformers containing dielectric fluids were punctured and the oil was distributed over the gravel parking area for dust supression. It is probable that some of the transformers drained at the site contained PCB dielectric fluids. Frequent pedestrian and traffic warrants public health and environmental concern.

Substances of Safety and Health Concern:

Waste Solvents and Degreasing Agents		Sludge Disposal	
Radioactive Wastes		Corrosive Liquids	
Treated Industrial Wastes		Plating Wastes	
Liquid Waste/Free Product Potential		Metal Wastes	
Asbestos Disposal		Cleaning Solutions	
PCB Disposal	x	Paint Wastes	
		Non-hazardous Wastes	

Level of Personnel Protection

		Monitoring Parameters	
Level A		Total Ionizable Pollutants	x
Level B		Explosion Potential	
Level C		Radiation	
Level D	x*		

*Chemically resistant clothing required with special attention to hand to mouth transfers.

Site Name: Site #3: Truman Annex DDT Mixing Area

Site Description: This site is located at the former site of Building 265, which has been demolished. In the 1940's through the 1970's however, dichlorodiphenyltrichloroethane (DDT) was mixed in 55-gallon drums and stored until it was sprayed for insect control. Accidental spills during mixing and filling may have contributed DDT to the soil and ground waters in this area.

nces of Safety and Health Concern:

Solvents and Degreasing Agents		Sludge Disposal	
Radioactive Wastes		Corrosive Liquids	
Treated Industrial Wastes		Plating Wastes	
Liquid Waste/Free Product Potential		Metal Wastes	
Asbestos Disposal		Cleaning Solutions	
PCB Disposal		Paint Wastes	
		Non-hazardous Wastes	
		Pesticide Disposal	x

Level of Personnel Protection

		Monitoring Parameters	
Level A		Total Ionizable Pollutants	x
Level B		Explosion Potential	
Level C		Radiation	
Level D	x*		

*Chemically resistant clothing required with special attention to inhibit hand to mouth transfer.

Site Name: Site 4: Open Disposal Area

Site Description: Located on the southeastern portion of Boca Chica Key (Figure 1), an open disposal area was operated from 1942 until the mid-1960's. The low-lying estuary area received all wastes generated at the NAS including: waste oils, hydraulic fluids, paint thinners and solvents. During its period of operation (20+ years) the site received 2,600 tons of waste. When wind conditions were appropriate, waste materials were burned on a daily basis.

Substances of Safety and Health Concern:

Waste Solvents and Degreasing Agents	x	Sludge Disposal	
Radioactive Wastes		Corrosive Liquids	x
Treated Industrial Wastes		Plating Wastes	
Liquid Waste/Free Product Potential		Metal Wastes	x
Asbestos Disposal		Cleaning Solutions	x
PCB Disposal	x	Paint Wastes	x
		Non-hazardous Wastes	

Level of Personnel Protection

Level A		Monitoring Parameters	
Level B		Total Ionizable Pollutants	x
Level C		Explosion Potential	x
Level D	x	Radiation	

Site Name: Site 5: Boca Chica DDT Mixing Area

Site Description: The Boca Chica DDT Mixing Area is located along the flight line of the airstrip and is the site of a DDT mixing operation (Figure 1). During the 1940's to the early 1970's, mixing operations were conducted in a building (Building 915) since removed. Spillage was not intentional but may have attributed to accidental loss of DDT during mixing and filling of containers. The odor of pesticide persists at the site.

Substances of Safety and Health Concern:

Waste Solvents and Degreasing Agents		Sludge Disposal	
Radioactive Wastes		Corrosive Liquids	
Treated Industrial Wastes		Plating Wastes	
Liquid Waste/Free Product Potential		Metal Wastes	
Asbestos Disposal		Cleaning Solutions	
PCB Disposal		Paint Wastes	
		Non-hazardous Wastes	
		Pesticide Disposal	x

Level of Personnel Protection

Level A		Monitoring Parameters	
Level B		Total Ionizable Pollutants	x
Level C	x*	Explosion Potential	
Level D		Radiation	

*Use of the TIP will determine if the personnel protection level should be lowered after drilling has begun.

Site Name: Site 7: Fleming Key North Landfill

Site Description: The Fleming Key North Landfill is located along the northern end of Fleming Key (Figure 1). The landfill covers an area of approximately 30 acres and was in use from 1952 to 1962. During this ten year period, the landfill received 4,000 to 5,000 tons of Naval Station waste annually. The identity of the waste disposed at this site is unknown.

Substances of Safety and Health Concern:

Waste Solvents and Degreasing Agents		Sludge Disposal	
Radioactive Wastes		Corrosive Liquids	
Treated Industrial Wastes		Plating Wastes	
Liquid Waste/Free Product Potential		Metal Wastes	
Asbestos Disposal		Cleaning Solutions	
PCB Disposal		Paint Wastes	
		Non-hazardous Wastes	
		Unknown	x

Level of Personnel Protection

Level A	
Level B	
Level C	
Level D	x

Monitoring Parameters

Total Ionizable Pollutants	x
Explosion Potential	x
Radiation	

Site Name: Site #8: Fleming Key South Landfill

Site Description: The Fleming Key South Landfill is located along the southern end of Fleming Key (Figure 1). The landfill began operation in 1962 and continued operation until 1980. The site has received various kinds of waste including general refuse (metal, wood, concrete) along with sewage sludge, waste oil, hydraulic fluid, paint thinner and solvents from NAS activities.

Substances of Safety and Health Concern:

Waste Solvents and Degreasing Agents	x	Sludge Disposal	x
Radioactive Wastes		Corrosive Liquids	
Treated Industrial Wastes		Plating Wastes	
Liquid Waste/Free Product Potential		Metal Wastes	
Asbestos Disposal		Cleaning Solutions	
PCB Disposal		Paint Wastes	x
		Non-hazardous Wastes	x

Level of Personnel Protection

Level A	
Level B	
Level C	
Level D	x

Monitoring Parameters

Total Ionizable Pollutants	x
Explosion Potential	x
Radiation	

Site Name: Site #9: Trumbo Point Tank Farm

Site Description: The tank farm is located immediately east of the piers at the Trumbo Point Annex (see Figure 1). A variety of fuel has been stored at this tank farm including No. 6 fuel oil, diesel, aviation gasoline, JP-4, and JP-5.

Substances of Safety and Health Concern:

Waste Solvents and Degreasing Agents		Sludge Disposal	
Radioactive Wastes		Corrosive Liquids	
Treated Industrial Wastes		Plating Wastes	
Liquid Waste/Free Product Potential		Metal Wastes	
Asbestos Disposal		Cleaning Solutions	
PCB Disposal		Paint Wastes	
		Non-hazardous Wastes	
		Flammable Liquids	x

Level of Personnel Protection

		Monitoring Parameters	
Level A		Total Ionizable Pollutants	x
Level B		Explosion Potential	x
Level C		Radiation	
Level D	x*		

*Chemically resistant clothing required with special attention to inhibit hand to mouth transfer.

Site Name: Site #10: Fire-Fighting Training Area

Site Description: The Fire-Fighting Training Area is located immediately west of the blimp pads (see Figure 1). The site is approximately 100 ft x 100 ft in size and contains junk vehicles and aircraft. The vehicles are ignited using JP-5, waste oils, or hydraulic fluids as fuel.

Substances of Safety and Health Concern:

Waste Solvents and Degreasing Agents		Sludge Disposal	
		Corrosive Liquids	
[illegible]tive Wastes		Plating Wastes	
[illegible]ated Industrial Wastes		Metal Wastes	
Liquid Waste/Free Product Potential		Cleaning Solutions	
		Paint Wastes	
Asbestos Disposal		Non-hazardous Wastes	
PCB Disposal		Flammable Liquids	x

Level of Personnel Protection

Level A		Monitoring Parameters	
Level B		Total Ionizable Pollutants	x
Level C		Explosion Potential	x
Level D	x*	Radiation	

*Chemically resistant clothing required with special attention to inhibit hand to mouth transfer.

SITE PREPARATION

Each drill site should be prepared for foot and vehicular traffic by the removal of all tall weeds (4' or greater) within a 25-ft radius of the drilling location. Areas used to traverse between drilling locations and the support area should be visually reviewed on foot by the site safety coordinator to avoid sharp objects and harmful wildlife (snakes, bees, rats).

DETERMINATION OF WORK AREAS

G&M will define and identify the following areas at each drilling site and specify the equipment, operations, and personnel in the areas as defined below.

Zone 1: Exclusion Zone -- The exclusion zone is the zone where contamination exists or could occur (Figure 2). All people entering the exclusion zone will wear the prescribed level of protection. An entry and exit check point will be visually defined at the periphery of the exclusion zone to regulate the flow of personnel and equipment into and out of the zone.

Zone 2: Contamination Reduction Zone -- The area between the exclusion zone and the support zone is the contamination reduction zone. This zone provides a transition between contaminated area and the clean zone. Zone 2 serves as a buffer to further reduce the possibility of the clean zone becoming contaminated. It provides additional assurance that the physical transfer of contaminating substances on people, equipment, or in the air is limited through a combination of decontamination, distance between exclusion and support zones, air dilution, zone restrictions, and work functions. At the boundary between the exclusion and contamination reduction zones, decontamination stations will be established, as described in the decontamination procedures (see below).

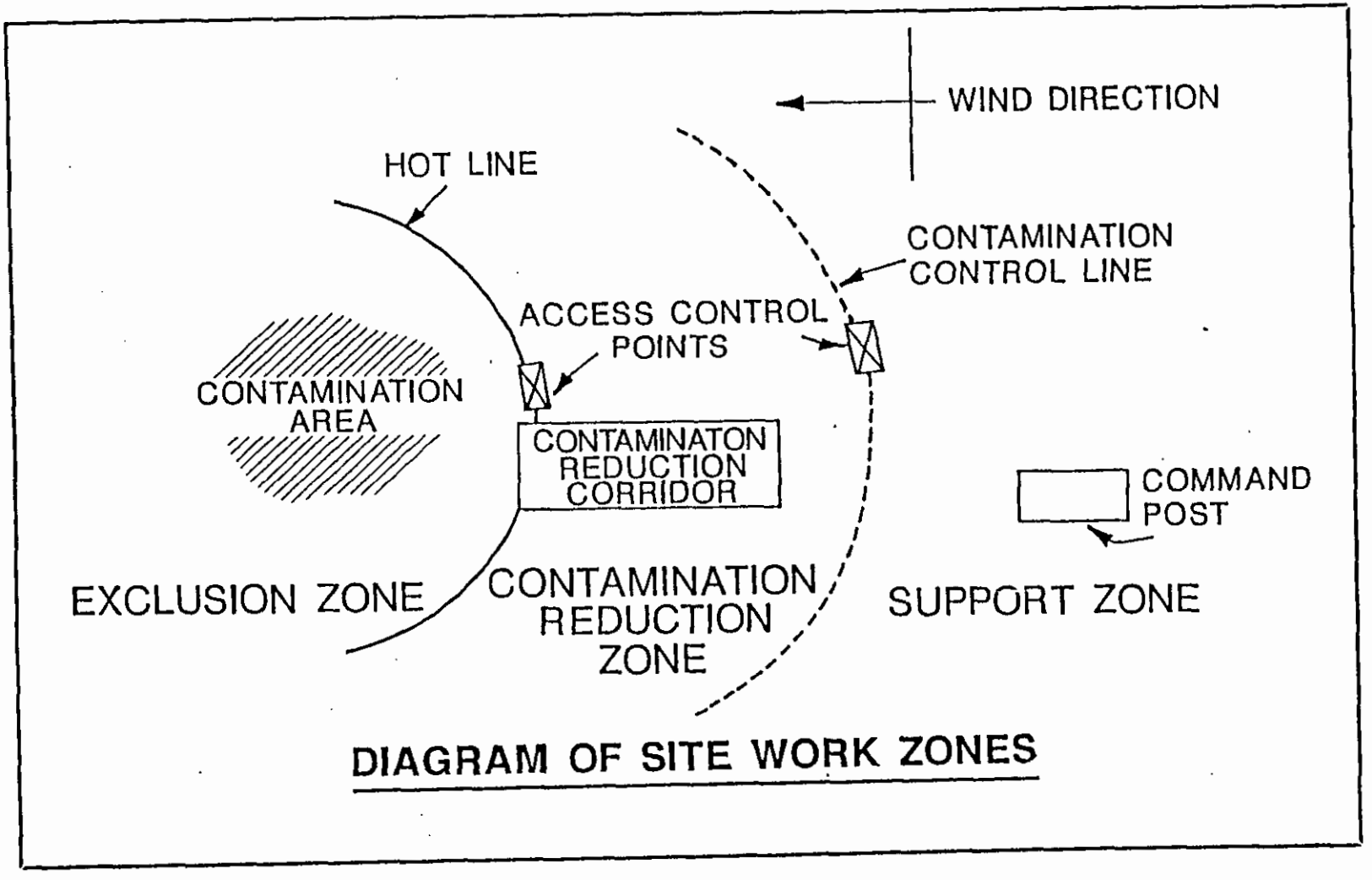


FIGURE 2. Diagram of Site Work Zones.

Zone 3: Support Zone -- This area is outside the zone of contamination. The support zone shall be marked and protected against contamination from the work site. The function of the area includes:

a. An entry area for personnel, material, and equipment.

b. An exit area for decontaminated personnel, materials, and equipment.

c. A storage area for clean safety and work equipment.

d. An area for rest breaks, the consumption of food and beverage, and all other activities.

Prohibitions in Contaminated Area

1. Beards and long sideburns
2. Eating, smoking, chewing
3. Personal articles, e.g., watches and rings
4. Working when ill
5. Complete removal of respirator under Level C protection

PERSONNEL PROTECTION PROGRAM

G&M has established and will maintain a Personnel Protection Program for all personnel working at the Site.

G&M will provide safety and health training for all Subcontractors, and service personnel assigned to the NAS Key West Facility for the purpose of performing or supervising work for health, safety, security, or administrative purposes, or for any other site investigation-related function. The level of protection required at each site has been designated by the site safety officer to be levels C and D. This determination if based upon a hazard evaluation of the site and previously documented information (see Site Description List and Waste Characteristics). The hazards may vary as drilling progresses.

PERSONNEL PROTECTION ZONE REQUIREMENTS

Personnel protective equipment for the exclusion zone is based upon OSHA requirements for each drilling site. Protective gloves, boots, and suits will be of material resistant to acids and organic chemicals present. All respiratory protective equipment will be approved by the National Institute for Occupational Safety and Health (NIOSH)/Mine Safety and Health Administration (MSHA).

All workers within the site boundary listed in Table 1 will require personnel protection at Level C. All workers within the boundaries of sites listed in Table 2 will require personnel protection at Level D as described below. Intermittent evaluation of the breathing zone for organic vapors using a TIP (Photovac Incorporated, Photoionization Detector) and an explosion meter (Gas Trac N6X-5) will be used to support the appropriateness of the level of personnel protection.

Level D protection will be upgraded if organic vapor levels exceed background conditions above 10 ppm in the breathing zone for more than 5 minutes. The protection level may be downgraded when the organic vapor concentration remains below 1 ppm above background in the breathing zone for more than 10 minutes.

TABLE 1 - LEVEL C PERSONNEL PROTECTION LEVEL

SITE 5: Boca Chica DDT Mixing Area

TABLE 2 - LEVEL D PERSONNEL PROTECTION LEVEL

SITE 1: Truman Annex Rufuse Disposal Area
SITE 2: Transformer Oil Disposal Area
SITE 3: Truman Annex DDT Mixing Area
SITE 4: Boca Chica Open Disposal Area
SITE 7: Fleming Key North Landfill
SITE 8: Fleming Key South Landfill
SITE 9: Trumbo Point Tank Farm
SITE 10: Fire-Fighting Training Area

A summation of Level C and Level D personnel protection is summarized below:

Level C Protection.

a. Full-face (half-face) piece, air-purifying, cartridge equipped respirator.

b. Tyvek chemical-resistant clothing, long sleeves, one or two pieces, requirement for hood to be determined.

c. Gloves (chemical resistant).

d. Steel toe and shank boots/shoes (safety or chemical-protective

e. Hard hat (face shield optional)

f. Options as required.

1) Coveralls (fire resistant)

2) Inner chemical-resistant gloves

3) Disposal outer boots (chemical-protective, heavy rubber vinyl disposables as appropriate

Level D Protection

a. Coveralls (Tyvek, may not necessarily be chemically resistant)

b. Gloves with inner gloves

c. Safety boots

d. Goggles or safety glasses

e. Hard hat

A complete description of the decontamination procedure is described in Appendix B.

PERMISSIBLE EXPOSURE LIMITS PROVISIONS

Inhalation

G&M shall limit employee or subcontractor exposure to an airborne concentration of total ionizable pollutants greater than 10 ppm throughout the course of the investigation. This level of protection shall be provided through the use of air-monitoring equipment at Level D personnel protection sites and the use of a half or full-face respirator equipped with disposal organic vapor cartridges at Level C personnel protection sites. All cartridges used at Level C personnel protection sites will be disposed and a fresh cartridge installed prior to work each day.

A Photovac TIP will be calibrated prior to use each morning to an isobutylene standard (100 ppm) to provide comparable readings during the day and a source of comparison during the investigation. Under no circumstances will site personnel enter the exclusion zone without the use of a respirator when Level C personnel protection is required.

An action level of 100 ppm total ionizable pollutants have been assigned (based upon a 100 ppm butylene standard) to determine the need to provide a higher level of personnel protection at the site (Level C to Level B). Complete removal of respirators within the exclusion zone is absolutely forbidden and may result in the dismissal of the employee from the project.

Initial Monitoring

All employees shall be assigned work functions within a singular personnel protective level on zone. Assignments within the exclusive zone (work zone) will receive monitoring (30 minute interval) of the respiratory parameters described above. Visitors and employees in a service capacity that remain in the support zone will not receive periodic exposure monitoring, nor will they be required to wear level C or D personnel protection wear.

RESPIRATORY PROTECTION

G&M shall require that respirators (half or full-face) are used continuously, where appropriate, to reduce employee exposure to airborne substances.

Respiratory Selection

G&M shall select and provide the appropriate type of granulated activated carbon cartridge respirator for all employees at the site. Prior to use of a respiratory protection device, G&M will provide a respiratory fit test to assure the proper use and fit of the device (see Training Program).

All subcontractors will provide respirators for their own employees from those approved by the National Institute for Occupational Safety and Health under provisions of 30 CFR Part II.

Visitor Protection

All visitors to the drilling site shall be instructed to stay outside the work zone and remain with the support zone during the extent of their stay.

Visitors shall be cautioned to avoid skin contact with contaminated or suspected contaminated surfaces. During visitation, hand-to-mouth transfers on-site should be reduced with special precautions not to eat, drink, smoke or chew (gum or tobacco).

The use of alcohol or medicine is prohibited.

Visitors requesting observation of the work zone (Zone A) must wear all appropriate personnel protective wear prior to entering the work zone. Should respiratory protective devices be necessary (Level C), visitors who wish to enter the work zone must produce evidence that they have had a complete physical examination and respiratory protection training within the past twelve months.

Visitor inspection of the work zone will be left to the discretion of the on-site safety coordinator.

NOTIFICATION OF EMERGENCIES

Written Plan: A written plan for emergency situations has been developed to address the immediate needs of on-site emergency activities (Figure 3). The plan describes the action that shall be implemented in the event of an emergency.

An Emergency Report (Table 3) must be completed and submitted to the site safety and health officer.

Alerting Employees

Alarms: Where there is a possibility of employee exposure to physical harm, the potential for an explosive situation, or elevated levels of organic vapors, the on-site safety coordinator shall be responsible to alert all employees by voice, or horn.

Evacuation: Employees not engaged in correcting the emergency shall be restricted from the area and shall not be permitted to return until the emergency is abated.

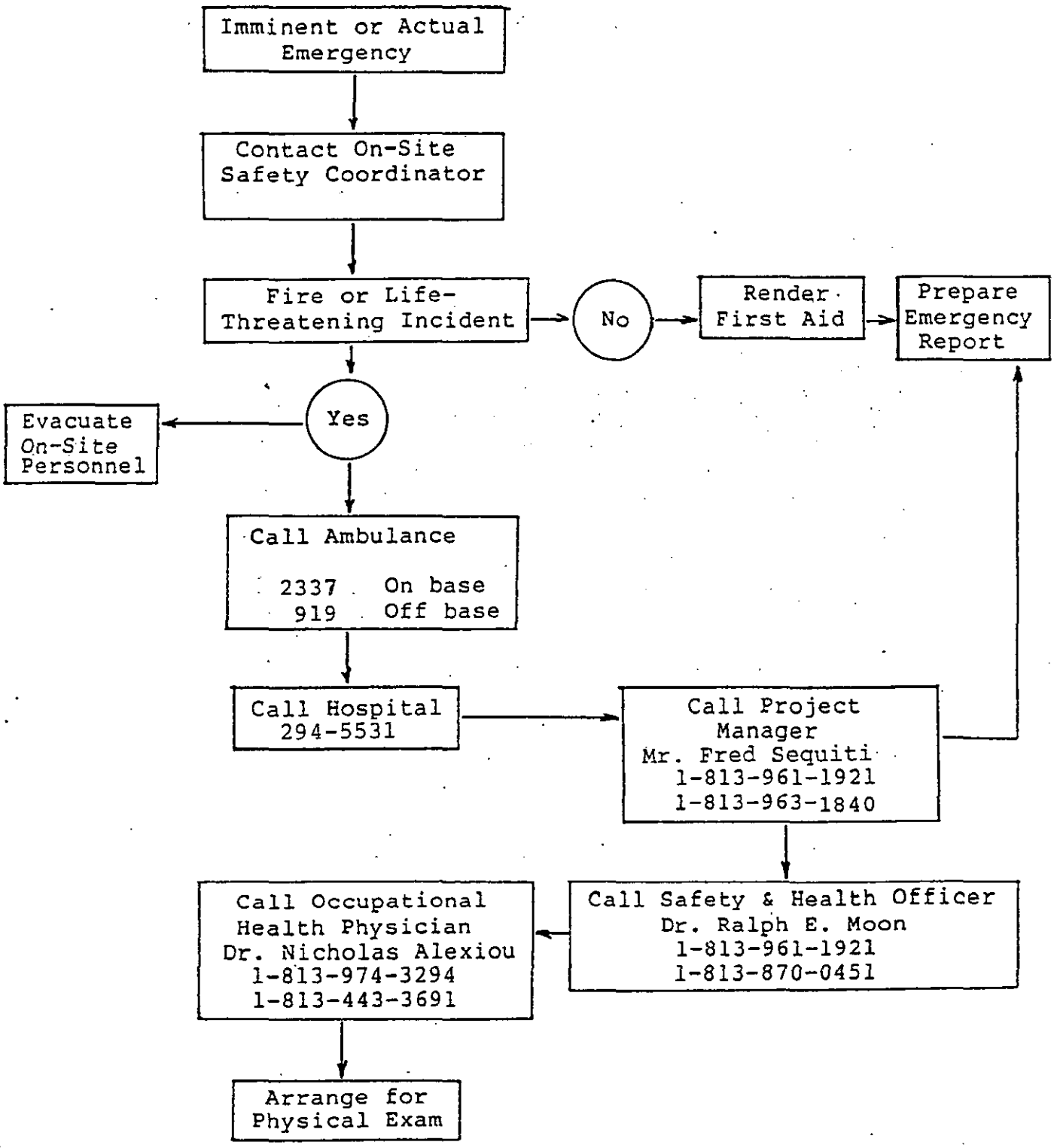


FIGURE 3. Emergency Action Plan.

TABLE 3. EMERGENCY REPORT

1. Date _____

2. Time of Accident _____

   Climatic Conditions _____

3. On-Site Coordinator _____

4. Employee Injured _____

5. Company Affiliation _____

6. Social Security Number _____

7. Insurance Company _____

8. Number of Workers at Site _____

Names of Workers	Company Affiliation
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

9. Circumstances of the Injury/Emergency Action _____

   _____

10. Emergency Actions Taken _____

    _____

11. What first aid was provided? _____

    _____

12. Was an emergency phone call made to the Project Safety Officer? ____ If so, time: _____

13. Ambulance Service Used _____

14. Hospital Used _____

15. Attending Physician _____

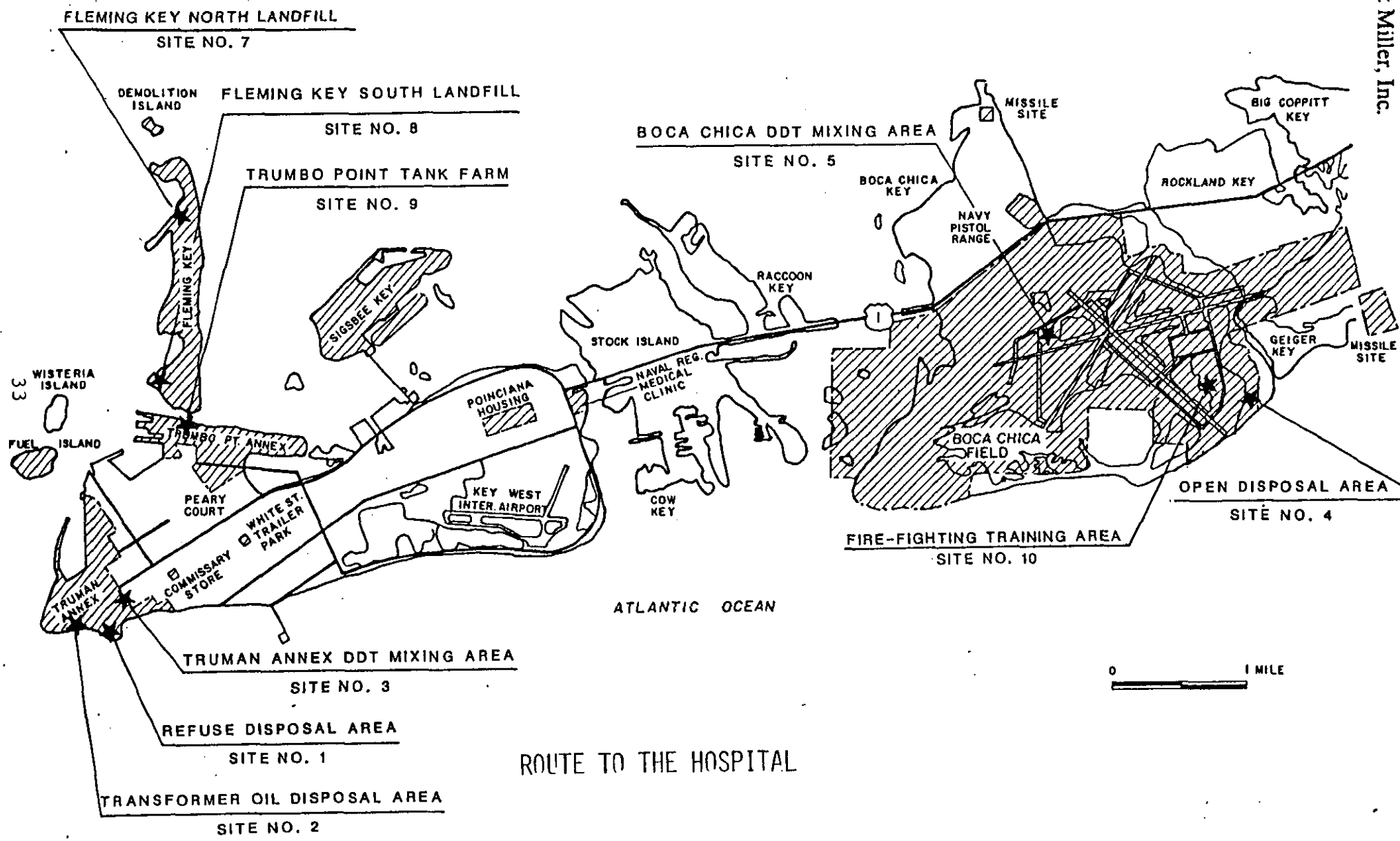
16. Company Representatives Contacted _____

17. Contractor Representatives Contacted _____

EMERGENCY AND FIRST AID REQUIREMENTS

G&M will contact emergency medical care services at a nearby medical facility and establish emergency routes (Figure 4).

In the event of any emergency which, in the opinion of the Site Safety Officer, materially endangers life, property, or the environment, G&M will cease all drilling at the Site; take action to remove or minimize the cause of the emergency; render assistance to local authorities to remedy any impact on local residents or property.



ROUTE TO THE HOSPITAL

SAFETY EQUIPMENT REQUIRED ON-SITE

- Emergency eye wash
- First aid kit
- 17 lb halon fire extinguisher or equivalent
- Organic vapor analyzer
- Drinking cups
- Decontamination facilities
- Explosion meter detector
- Emergency horn
- Garbage bags
- Paper towels
- Garbage cans
- Brushes
- Spray container

MEDICAL SURVEILLANCE

G&M has contracted the services of an occupational physician to provide medical examinations to all employees involved with the investigation. Prior to assigning job tasks to individuals comprising the investigative team (including well-drilling subcontractors), G&M will provide the Naval Facilities Engineering Command certification upon request that each on-site person is in good health and is capable of wearing the appropriate dermal and respiratory protective clothing/equipment necessary during the course of the investigation. All individuals associated with the on-site investigations shall have undergone a physical examination at least 12 months prior to the start date. A list of medical parameters to be included in the physical examination are described in Appendix C.

During drilling activity, an occupational health physician shall be in verbal contact with the Site Health and Safety Officer to report and provide professional health recommendations during the course of the work.

Medical examination and surveillance requirements will also apply to all on-site personnel subcontracted by G&M. G&M will maintain all medical surveillance records on-site and make these records available to the Navy Facilities Engineering Command.

HOUSEKEEPING

General: The contractor shall implement a housekeeping program during the course of the investigation to minimize the spread of contaminants beyond the work site (exclusion area).

The program shall include:

1. Periodic scheduling to police the work area of debris including paper products, cans etc.

2. Periodic changing of wash water and rinse for hand, face, and equipment.

3. Periodic removal (daily minimum) of all garbage bags and containers used to dispose of food products, plastic inner gloves, and contaminated disposable clothing (Tyvek).

WASTE DISPOSAL

General: G&M and its subcontractors will not remove material from the site that may potentially endanger the health and safety of on-site employees or the general public.

Waste Food Containers: During and following lunch and break periods, all waste materials shall be collected (by all individuals) and disposed in waste containers provided by the Contractor.

PERSONAL HYGIENE

A personal hygiene program helps to ensure that all workers are not exposed to harmful levels of hazardous materials. Your ability to observe and adhere to the personal hygiene provisions is fundamental to the success of the site health and safety plan.

General

- All on-site workers will be prohibited from drinking alcohol during the work day.
- On hot days, or when the drill crew is subject to heavy physical labor, a rest period will be provided at the discretion of the safety coordinator and the work schedule.
- Members of the drilling crew and G&M employees must wash their hands prior to leaving the exclusion work site.
- Disposable protective wear must be disposed on-site in garbage bags provided.
- All workers must be familiar with the use of protective clothing and its limitations. This includes disposable coveralls, gloves/inner gloves, goggles/safety glasses, hard hats and safety shoes.

ON-SITE TRAINING

G&M will provide training to all members of the drilling crew prior to the start of work. The training will include all the items listed below and emergency instruction for chemical exposure or release, fire or explosion, and personal injury. The training session will be at least two hours in duration.

a. Site Health and Safety Plan

b. Physical health hazards identified at the Site including acute and chronic effects of waste constituents identified at the site.

c. Personal hygiene

d. Safety equipment and procedures required for personal protection

e. Proper use and fitting of respirators

f. Work zones established at the Site

g. Prohibitions in contaminated areas:

   1) Beards and long sideburns

   2) Eating, smoking, chewing

   3) Personal articles, e.g., watches and rings

   4) Working when ill

h. Buddy system

i. Medical surveillance

G&M will not allow personnel to enter the Site to perform work who have not successfully completed the required training.

APPENDIX A

INDEX OF ABBREVIATIONS

ACGIH:	American Conference of Governmental Industrial Hygienists
CCROV:	Chemicl Cartridge Respirator with an Organic Vapor Cartridge
CCROVF:	Chemical Cartridge Respirator with an Organic Vapor Cartridge with a Full-Face Piece
GMOVC:	Gas Mask with an Organic Vapor Canister (Chin Style)
IDLH:	Immediately Dangerous to Life and Health
LEL:	Lower Explosive Limit
Max. Use Conc.:	Maximum Use Concentration
mmHg:	millimeters of Mercury
NIOSH:	National Institute for Occupational Safety and Health
OSHA:	Occupational Safety and Health Administration
ppm:	parts per million
SA:	Supplied Air Respirator
SCBA:	Self-Contained Breathing Apparatus
STEL:	Short Term Exposure Limit
TWA:	Time Weighted Average

NAPHTHA (Mineral Spirits)

Permissible Exposure Limits:

- o 350 mg/m^3 NIOSH Recommended TWA
- o 1800 mg/m^3 NIOSH Recommended 15 minute ceiling

Vapor Pressure @ 20°C, mmHg:NA

Personal Protective Equipment:

No NIOSH/OSHA Data

- o Recommend prevent repeated or prolonged skin contact
- o Wear impervious clothing (Nitrile Rubber, PVA, Neoprene)
- o Wear gloves
- o Wear faceshield (8 inch min.)
  Goggles: No standard requirement but advise eye protection to prevent reasonable probability of eye contact, wear faceshield or vented goggles.

Respirator Selection:

- o No spec: Advise CCROV*
- o High Concentration SCBAF**

Route of entry to body:

- o Inhalation, skin or eye contact, ingestion

Symptoms:

Irritation of respiratory system, eyes, nose, skin; coughing, CNS depression, fever, resp. edema, nausea, vomiting, pharyngitis, visual disturbnce, dizziness, unconsciousness, abdominal pain, weakness, cardiac arrhythmia, dermatitis, dyspnea, pnevmonitis, bronchitis, comatose, headach, ventricular fibrillation, conjunctivitis, diarrhea, drowsiness, kidney damage, liver damage, convulsions, weightloss, anemia, dyspnea, nervousness, irritability, ataxia, paresthesia, extremities numbness.

* CCROV: Chemical cartridge respiraton with organic vapor canister

** SCBAF: Self contained breathing apparatus with full face-piece

DDT

PERMISSIBLE EXPOSURE LIMIT:

- 1 mg/m^3 OSHA TWA (Skin Notation)
- 1 mg/m^3 ACGIH TWA (Skin Notation)

Toxicology:

Indefinite human carcinogen; DDT and other halobenzene derivatives are primary skin irritants and convulsant poisons.

Acute poisoning results in weakness, vomiting, apprehension, diarrhea, and paresthesias of the tongue, face and lips. Twitching of the eyelids may be evident, with tremors of the head and neck and then of the extremities. Respiration is rapid at first, but then slow. Solvents increase the depressant effects of DDT, but increase the convulsant effect.

Vapor pressure @ 20° C mmHg: 0.00000017 mm

Personal Protective Equipment:

- Prevent repeated or prolonged skin contact
- Wear impervious clothing
- Wear gloves
- Wear dust resistant safety goggles
- Do not eat or smoke in areas where DDT is handled.

Respirator Selection:

- Max Use Conc. 10 mg/m^3 - CCROV* with a dust and mist filter including pesticide respirator meeting these requirements or SA/SCBA**.

Route of entry to body:

- Inhalation, Skin absorption, ingestion, skin or eye contact.

Symptoms:

Irritation of eyes, skin; CNS depression, paresthesia, tremors, blepharospasm, apprehension, excitation, dizziness, confusion, malaise, headache, convulsions, cyanosis, nausea, vomiting, diarrhea, weakness, numbness of extremities, unconsciousness.

* CCROV: Chemical Cartridge Respirator with Organic Vapor Cannister

** SA/SCBA: Supplied Air Respirator or Self-Contained Breathing Apparatus

TOLUENE

Permissible Exposure Limit:

- 200 ppm OSHA TWA - 300 ppm OSHA ceiling
- 500 ppm OSHA 10 minute peak
- 100 ppm ACGIH TWA (Skin Notation)
- 100 ppm NIOSH Recommended TWA
- 200 ppm NIOSH Recommended 10 minute ceiling

Toxicology:

Toluene is a primary skin irritant and central nervous system depressant. Acute poisoning affects the nervous system, leading to coma. Chronic exposure depresses the bone marrow, but without the severe or fatal damage present in benzene posioning.

Prolonged skin contact causes defatting, leading to dermatitis. Eye and respiratory irritation occurs at elevated concentrations.

Note: Odor threshold is below the permissible exposure limit, thus toluene is considered to have good warning properties.

IDLH: 2000 ppm OSHA/NIOSH

Vapor pressure @ 20° C mmHg: 22 mm

Personal Protective Equipment:

OSHA/NIOSH Requirements

- Prevent repeated or prolonged skin contact
- Wear impervious clothing (Viton material recommended)
- Wear gloves (Viton material recommended)
- Wear splash proof safety goggles

Respirator Selection:

- Max Use Conc. 500 ppm: CCROV/SA/SCBA*

Route of entry into body:

- Inhalation, skin absorption, ingestion, skin or eye contact

Symptoms:

Irritation of mucous membranes, respiratory system, skin, eyes, fatigue, weakness, euphoria, confusion, lacrimation, headache, dizziness, drowsiness, numbness,

conjunctivitis, anorexia, weight loss, irritability, tinnitus muscular fatigue, insomnia, dermatitis, photophobia, CNS depression, respiratory edema, incoordination, tremors, collapse, ataxia, leukopenia, hematopoietic blood changes, nausea, kidney damage, liver damage, keratitus, nervousness, dilated pupils, CNS damage.

*CCROV/SA/SCBA: Chemical Cartridge Respirator with an Organic Vapor Cartridge or Supplied Air Respirator or Self-Contained Breathing Appratus

METHYL ETHYL KETONE

Permissible Exposure Limit

- 200 ppm OSHA TWA
- 200 ppm ACGIH TWA
- 300 ppm ACGIH STEL
- 590 mg/m^3 NIOSH Recommended TWA

Toxicology:

MEK is a mild eye and mucous membrane irritant, primary skin irritant, and CNS depressant.

Acute exposure irritates the eyes, skin, and respiratory tract. Direct contact causes painful irritation and cornea injury. Repeated or prolonged skin contact may lead to dermatitis.

At high concentrations, MEK acts as a narcotic. Peripheral neuropathy may also accur.

Note: The irritant and odor properties are considered adequate warning properties.

IDLH: 3000 ppm

Vapor pressure @ 20°C mmHg: 70 mm

Personal Protective Equipment - OSHA/NIOSH STANDARD

- Prevent repeated or prolonged skin contact
- Wear impervious clothing - (Butyl Rubber)
- Wear gloves
- Wear splash proof safety goggles

Respirator Selection

- Max. use Conc,: 1000 ppm CCROVF*

Route of entry into body:

- Inhalation, ingestion, skin absorption, skin or eye contact

Symptoms:

Irritation of mucous membranes, eyes, nose, throat, conjunctivitis, headache, dizziness, drowsiness, confusion, vomiting, narcosis, CNS depression, peripheral neuropathy, numbness of extremities, dermatitis, nausea, corneal injury.

*CCROVF: Chemical Cartridge Respirator with an Organic Vapor Cartridge with a Full-Face Piece

ACETONE

Permissible Exposure Limit

- 1000 ppm OSHA TWA (2400 mg/m^3)
- 250 ppm NIOSH Recommended TWA
- 750 ppm ACGIH TWA
- 1000 ppm ACGIH STEL

Toxicology:

Acetone is a mild eye and mucous membrane irritant, primary skin irritant and CNS depressant. Acute exposure irritates the eyes and upper respiratory tract. Direct skin contact produces dermatitis, characterized by dryness and erythema. High concentrations produce narcosis and hypoglycemia. The use of alcoholic beverages enhances the neurotoxic effects.

IDLH: 20,000 ppm OSHA/NIOSH.

Vapor pressure @ 20^oC mmHg: 26 mm

Personal Protective Equipment:

- Recommend prevent repeated or prolonged skin contact.
- Wear impervious clothing (Butyl rubber - excellent)
- Wear gloves
- Wear goggles (Splash proof)

Respirator Selection:

- Max. Use Conc: 5000 ppm GMOVC*

Route of entry to body:

- Inhalation, skin absorption, ingestion, skin or eye contact

Symptoms:

Irritation of eyes, nose, throat, conjunctivitis, CNS depression, respiratory irritation, pharyngiis, bronchitis, coughing, hypoglycemia, headache, dizziness, nausea, lassitude, vomiting, paralysis, corneal erosion, eczema, confusion, narcosis, weakness, collapse, convulsions, gastritis, hematemesis, anxiety.

*GMOVC: Gas Mask with an Organic Vapor Canister (Chin Style)

PCB - AROCLOR

Permissible Exposure Limit

- 1.0 Ug/M^3 NIOSH TWA

Toxicology: Suspect human carcinogen

Vapor Pressure @ 20°C mmHg: 0.00006 mm NIOSH

Personal Protective Equipment

- No NIOSH/OSHA Data
- Prevent any possibility of skin contact with liquid
- Wear impervious clothing
- Wear gloves
- Wear faceshield

Respirator Selection

- Use with a full face piece, helmet or hood
- Max. Use Conc.: 5 mg/m^3 use SAF/SCBAF*
- Escape: Gas mask with a pesticide canister (Chin style or front or back mounted canister)

Route of entry to body:

- Inhalation, ingestion, skin or eye contact

Symptoms:

Chloracne, liver damage, jaundice, drowsiness, weakness, nausea, vomiting, weight loss, comatose, kidney edema, cardiac edema, adrenal degeneration.

* SAF/SCBAF: Supplied Air Respirator with Full-Face Piece or Self Contained Breathing Apparatus with Full-Face Piece

DICYCLOPENTADIENE - JET FUEL JP-4

Permissable Exposure Limit

- 5 ppm ACGIH TWA

Odor threshold - 0.003 ppm

Toxicology:

- Irritant
- High concentrations affect central nervous system
- Liver, kidney damage may occur
- Because of low vapor pressure, inhalation of toxic amounts is not likely at normal temperature
- Threshold limit value was set to prevent significant irritation and possible chronic effects

Vapor pressure @ 20^{o} C mmHg: 1.4 mm

Route of entry to body:

- Inhalation
- Ingestion
- Skin or eye contact

Manifestations after inhalation or absorption:

Mucous membrane irritation, respiratory distress, prevmonitis, bronchitis, eye irritation, skin irritation, respiratory irritation, coughing, abdominal pain, headache, leukocytosis, CNS depression, dizziness, drowsiness, substernal pain, kidney damage, liver damage, incoordination, convulsions.

Personal Protective Equipment

No NIOSH/OSHA Data, recommend prevent repeated or prolonged skin contact. Wear impervious clothing, wear gloves, wear (8" min) faceshield.

DIESEL FUEL

Permissible Exposure Limit

- o None established
- o Odor threshold 0.08 ppm

Vapor pressure @ 20° C mmHg: NA

UEL - 6% by Volume
LEL - 1.3% by Volume
Autoignition Temperature: 350 - 625F

Personal Protective Equipment:

- o No NIOSH/OSHA Data
- o Recommend prevent repeated or prolonged skin contact
- o Wear impervious clothing
- o Wear gloves
- o Wear face shield (8" min.) or vented goggles

Respirator Selection:

- o No specifications
- o Advise chemical cartridge respirator with an organic vapor cartridge (CCROV)

Route of entry into body:

- o Inhalation, skin or eye contact, ingestion

Symptoms:

Respiratory irritation, mucous membrane irritation, skin irritation, eye irritation, dermatitis, dyspnea, eczema, pneumonitits, unconsciousness, CNS depression, nausea, headache, vomiting, incoordination, respiratory edema, dizziness, stupor, convulsions, abdominl pain, coughing, hematopoietic blood changes if benzene in substance.

XYLENE

Permissible Exposure Limit

- 100 ppm OSHA TWA
- 100 ppm ACGIH TWA
- 150 ppm ACGIH STEL
- 100 ppm NIOSH recommended TWA
- 200 ppm NIOSH recommended 10 minute ceiling

Toxicology: Experimental Carcinogen, teratogenic and mutagenic

Xylene is a mild eye and mucous membrane irritant, primary skin irritant and CNS depressant. Ingestion causes severe gastro intestinal upset and creates an aspiration hazard.

Chronic inhalation results in symptoms that resemble acute poisoning, but are more severe systemically. Bone marrow depression does not occur as in benzene exposure, but hyperplasia may be evident.

Xylene vapor is an eye, skin and mucous membrane irritant. Direct eye contact causes conjunctivitis and corneal burns.

IDLH: 10,000 ppm OSHA/NIOSH

Vapor Pressure @ 20°C mmHg: 6mm

Personal Protective Equipment:

- Prevent repeated or prolonged skin contact
- Wear impervious clothing (Polyvinyl, alcohol, nitrile rubber, polyurethane, Viton)
- Wear gloves
- Wear splash-proof safety goggles

Respirator Selection:

- Max. Use Conc. 1000 ppm - CCROVF*

Route of entry into body:

- *Inhalation, skin absorption, ingestion, skin or eye contact*

Symptoms:

Irritation of eyes, nose, throat, skin, mucous membranes, respiratory system, dermatitis, conjunctivitis, keratitis, headache, dizziness, drowsiness, fatigue, irritability, excitation, vertigo,

anorexia, weight loss, abdominal pain, nausea, vomiting incoordination, paresthesia, respiratory edema, pneumonia, dyspnea, eye damage, anemia, anesthesia, narcosis, CNS depression, liver damage, kidney damage, unconsciousness.

* CCROVF: Chemical Cartridge Respirator with an Organic Vapor Cartridge and a Full-Face Piece

APPENDIX B

DECONTAMINATION PROCEDURES

Level D, Minimum Layout

A. EQUIPMENT WORN

The decontamination procedure outlined is for workers wearing Level D protection, consisting of:

- Tyvek suit
- Hard hat
- Chemical resistant steel-toe shoes
- Inner and outer gloves
- Safety glasses/goggles

B. Procedure for Full Decontamination

Station 1: Segregated Equipment Drop

Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards) on a plastic drop cloth or in different containers with plastic liners.

Equipment: various size containers
plastic liners
plastic drop cloths

Station 2: Outer garment, boots, and glove wash and rinse

Scrub outer boots, outer gloves, with decon solution or detergent water, rinse with water.

Equipment: containers (30-50 gallons)
decon solution or detergent

Station 3: Boot, gloves, and outer garment removal

Boots and outer gloves are removed and placed outside the decontamination zone. Inner gloves and Tyvek suit are deposited in separate containers lined with plastic.

Equipment: containers (30-50 gallons)
plastic liners

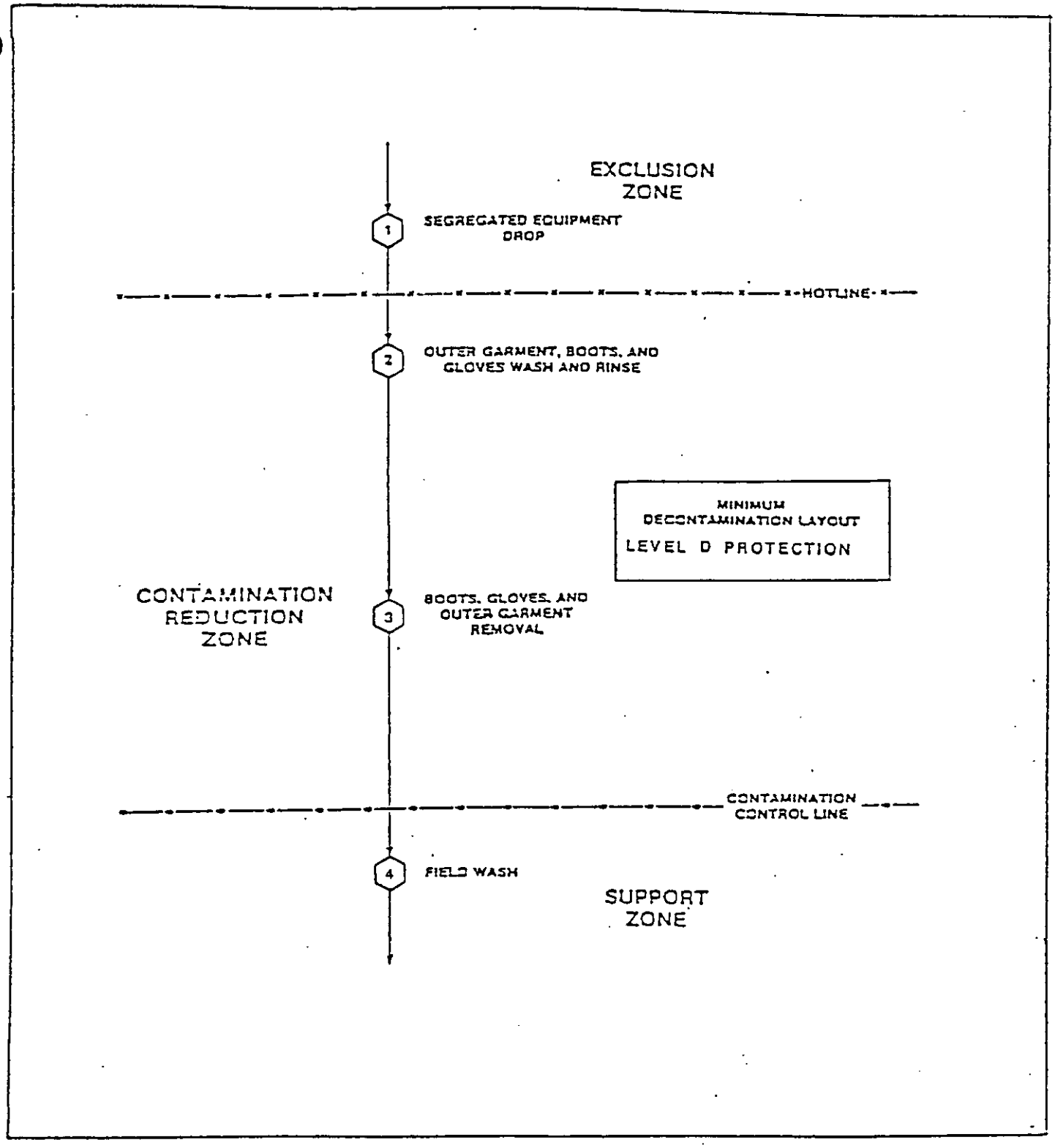


FIGURE 2. Level D Protection.

Station 4: Field wash

Thoroughly wash hands and face. Shower as soon as possible.

Equipment: water, wash basin/bucket, soap .

Level C, Minimum Layout

A. EQUIPMENT WORN

The decontamination procedure outlined is for workers wearing Level C protection (with taped joints between gloves, boots, and suit) consisting of:

- Chemically resistant suit with integral boots and gloves.
- Half-face or full-face respirator
- Hard hat
- Chemical-resistant, steel-toe, and shank boots
- Boot covers
- Inner and outer gloves

B. PROCEDURE FOR FULL DECONTAMINATION

Station 1: Segregated Equipment Drop

Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Each will be contaminated to a different degree. Segregation at the drop reduces the probability of cross-contamination.

Equipment: various size containers
plastic liners
plastic drop clothes

Station 2: Outer Garment, Boots, and Gloves Wash and Rinse

Scrub outer boots, outer gloves, and fully-encapsulating suit with decon solution or detergent water. Rinse off using copious amounts of water.

Equipment: containers (30-50 gallons)
decon solution or detergent water
rinse water
2-3 long-handle, soft-bristle scrub brushes

Station 3: Outer Boot and Glove Removal

Remove outer boots and gloves. Deposit in container with plastic liner.

Equipment: container (30-50 gallons)
plastic liners
bench or stool

Station 4: Respirator Change

If worker leaves Exclusion Zone to change the respiratory cartridge, this is the last step in the contamination procedure. Worker's cartridge is changed, outer gloves and boot covers donned, joints taped, and worker returns to duty.

Equipment: cartridges
tape
boot covers
gloves

Station 5: Boot, Gloves, and Outer Garment Removal

Boots, chemically resistant suit, and inner gloves removed and deposited in separate containers lined with plastic.

Equipment: containers (30-50 gallons)
plastic liners
bench or stool

Station 6: Respirator Removal and Decontamination

Respirator is removed. Hands and face are thoroughly washed. Respirator placed on plastic sheets.

Equipment: plastic sheets
basin or bucket
soap and towels
bench
sprayer

Full and half-face respirators will require decontamination following work each day. Organic vapor cartridges should be discarded into the garbage bags provided. The remaining face pieces should be washed in the detergent water provided and rinsed with water from

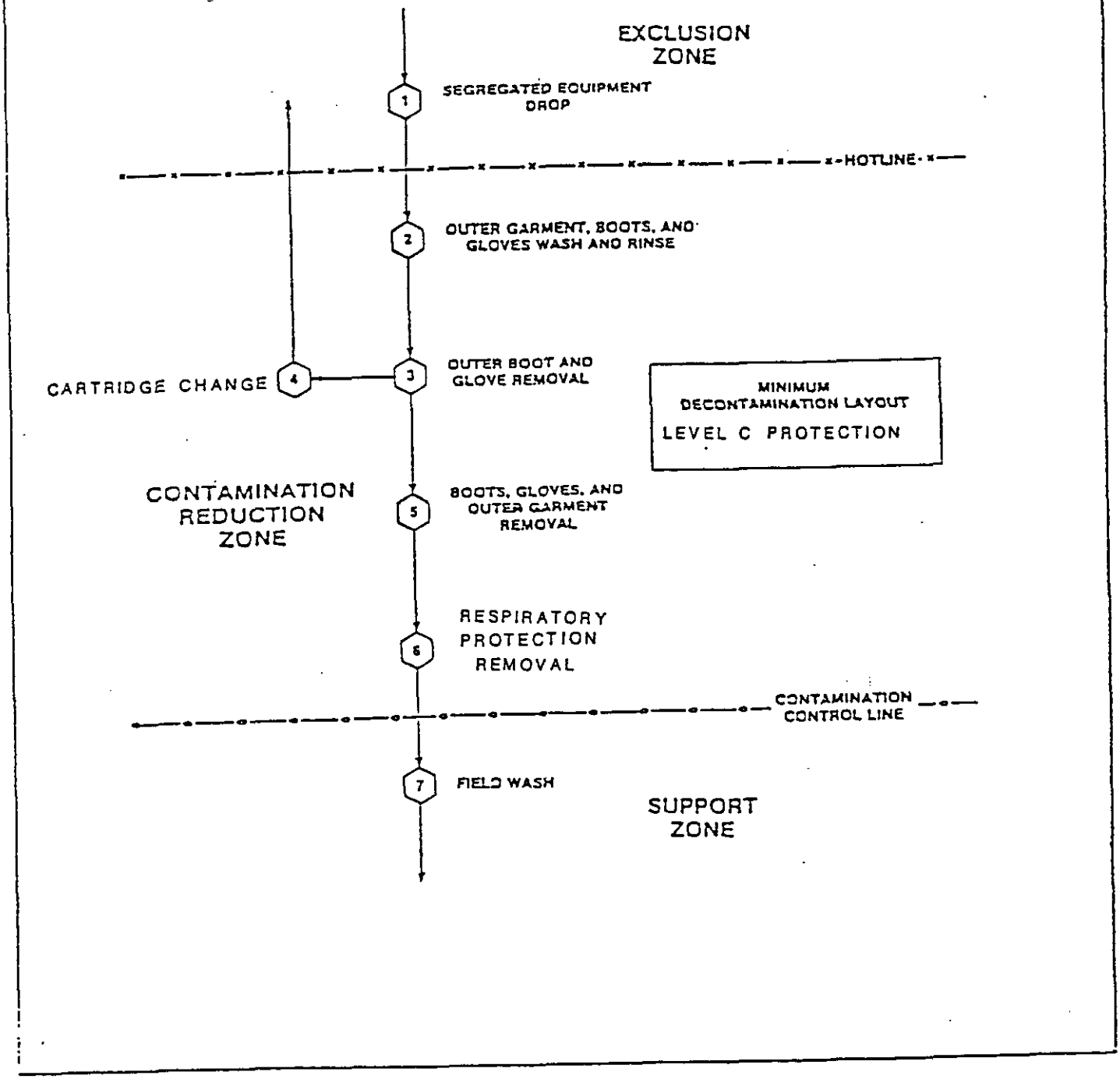


FIGURE 3. Level C. Protection.

the distilled water sprayer. Paper towels should be used to dry the face plate following the decontamination procedure.

Station 7: Field Wash

Thoroughly wash hands and face. Shower as soon as possible.

Equipment: water
soap
tables
wash basin/bucket

APPENDIX C

(SAMPLE OUTLINE)

Att. #1

Pre-Employment Medical Evaluation

(Title of Project)

Employee's Name: _____

This is to certify that I have personally conducted a complete medical and work history, a physical examination, and evaluation of the employee identified above. The examination and tests were performed by myself or by a medical laboratory certified by the State of California. The evaluation included the items shown on the list which I have attached to this form.

In my opinion, on the basis of these examinations and evaluations, I feel the employee is physically and medically qualified for the proposed employment.

Date: _____

Signed: _____ M.D. (or D.O.)

The following physical requirements have been evaluated by a qualified occupational health physician on all Geraghty & Miller, Inc., personnel associated with the investigation to assure that they are certified to perform work at the NAS Key West site.

1. Compiliation of a complete occupational health history.
2. Compilation of a complete family health history.
3. Blood analysis (SMAC-25)
4. Urine analysis
5. PCB level in the blood.
6. Chest X-ray (front only)
7. Hearing examination
8. Sight examination
9. Pulmonary function examination
10. Electrocardiogram examination
11. Complete physical examination